



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,124	03/10/2004	Ichiro Matsubara	Q79432	2477
23373	7590	09/18/2006		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER SINES, BRIAN J	
			ART UNIT	PAPER NUMBER
			1743	

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/796,124

Applicant(s)

MATSUBARA ET AL.

Examiner

Brian J. Sines

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of group I comprising claims 1 – 11 in the reply filed on 6/29/2006 is acknowledged.

Claims 12 – 16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 – 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 8 – 11 recite the limitation "gas sensor" in each of their preambles. There is insufficient antecedent basis for this limitation in the claim. The claims are directed to a method for manufacturing a gas sensor. For example, regarding claim 8, the claim preamble should be appropriately written as: "The *method* of claim 7, ..."

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Uma et al. (ref. no. 3 on the IDS filed 2/3/2005).

Regarding claims 1, 3 and 4, Uma anticipates a hybrid organic/inorganic nanocomposite material structure comprising a organic-inorganic hybrid material comprising layers of an inorganic compound and an organic compound (i.e., aniline conductive polymer) intercalated between the layers of an inorganic compound (i.e., a layered structure comprising molybdenum oxide ( $\alpha$ -MoO<sub>3</sub>)) (see section 1. Introduction). The statement in the preamble that the claimed structure is directed to a gas sensor is considered a statement of intended use.

Regarding claims 2 and 5, since the cited prior art teaches the identical claimed structure, it is inherently anticipated that the prior art structure would also exhibit the same recited functional properties.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uma.

Regarding claim 6, Uma does not specifically teach that the disclosed material comprises individual inorganic and organic layers having a thickness of less than 1 nm and that they are alternately laminated to each other. Uma does teach that the disclosed material is a nanocomposite material having nanometer dimensions (see section 1. Introduction). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate individual layer thickness of approximately 1 nm or less.

Regarding claim 6, the statement that the claimed apparatus is laminated is considered a product-by-process claim. The determination of patentability is based upon the apparatus structure itself. The patentability of a product or apparatus does not depend on its method of production or formation. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (see MPEP § 2113).

2. Claims 7 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uma in view of Bizeto et al. (ref. no. 1 on the IDS filed 2/3/2005) (hereinafter “Bizeto”).

Regarding claims 7, 9 and 10, Uma teaches a method for making a hybrid organic/inorganic nanocomposite material structure comprising a organic-inorganic hybrid material comprising layers of an inorganic compound and an organic compound (i.e., aniline conductive polymer) intercalated between the layers of an inorganic compound (i.e., a layered structure comprising molybdenum oxide ( $\alpha\text{-MoO}_3$ )) (see section 1. Introduction; 2. Experimental details).

Art Unit: 1743

Uma does not specifically teach the use of this material as a gas sensing material.

However, the use of these types of nanocomposite materials as sensing materials is known in the art. For example, Bizeto does recognize that these types of nanostructured materials are suitable for use in sensors. Bizeto teaches that layered compounds have been extensively investigated with purposes of producing advanced materials through the intercalation of guest species into a two-dimensional host interlayer region. The host-guest interactions produce materials that can be employed as sensors (see section 1. Introduction). Thus, a person of ordinary skill in the art would have recognized the suitability of using the claimed nanocomposite material as a sensing material. Additionally, a person of ordinary skill in the art would accordingly have had a reasonable expectation for success in employing the claimed material structure as a sensing material. Therefore, it would have been obvious to a person of ordinary skill in the art to use the claimed material as a sensing element in a gas sensor.

Regarding claims 8 and 11, since the cited prior art teaches the identical claimed structure, it is inherently anticipated that the prior art structure would also exhibit the same recited functional properties.

### ***Conclusion***

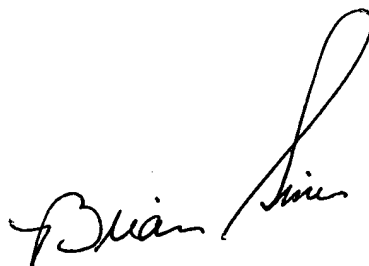
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional cited prior art teach related nanocomposite materials and methods of making these materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

Art Unit: 1743

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "Brian". The signature is stylized with a large, looping flourish at the end.